Review article

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Malnutrition in primary health care

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Malnutrition is a state of imbalance in the intake and utilization of nutrients that leads to loss of body weight, muscle mass and dysfunction of the body. There are three different forms of malnutrition: marasmus, kwashiorkor and protein-energy malnutrition. In IKB-10, codes E40-E46 belong to it. That's a 10-15% loss of body weight. If the loss is greater than 30%, there is a risk of death. Infectious/environmental, genetic/autoimmune and influence of lifestyle and diet. Symptoms from all organ systems may be present. Respiratory - dyspnea, respiratory acidosis; cardiovascular-reduced extracellular fluid, reduced preload, reduced cardiac output, slowed peripheral circulation; gastrointestinal tract-enterocytes or colonocytes have reduced absorption. Based on nutritional screening, diagnosis with the help of GLIM criteria, assessment of nutritional status, nutritional plan checked by monitoring. Oral nutritional supplements are used for diabetics, lung patients or pressure ulcer patients. Atreficial nutrition means enteral nutrition through a jejunocolostomy and parenteral through a central venous catheter. The paper highlights the importance of the chosen doctor in the first recognition of malnutrition. The importance of early nutritional intervention is shown. Various nutritional strategies have been indicated in improving treatment outcomes. Application of personalized nutritional support is very important to improve treatment outcome. A multidisciplinary approach at the level of primary health care is important in order to detect malnutrition in the initial phase, because nutritional care is one of the human rights.

Key words: malnutrition, supplements, chosen doctor

Pregledni rad

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Malnutricija u primarnoj zdravstvenoj zaštiti

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Malnutricija je stanje disbalansa unosa i iskoristljivosti nutrijenata koji dovodi do gubitka telesne težine, mišićne mase i disfunkcije organizma. Razlikuju se tri različite forme malnutricije: marazmus, kvašiorkor i proteinsko –energetska malnutricija. U MKB-10 joj pripadaju šifre E40-E46. To je gubitak telesne težine 10-15%. Ukoliko je gubitak veći od 30% postoji rizik od smrtnog ishoda. Zarazni/ekološki, genetski/autoimuni i uticaj načina života i ishrane. Kada je u pitanju klinička slika, mogu biti prisutni simptomi od svih sistema organa. Respiratorni- dispneja, respiratorna acidoza; kardiovaskularni- smanjena ekstracelularna tečnost, smanjen preload, snižen minutni volume srca, usporena periferna cirkulacija; gastrointestinalni trakt-enterociti ili kolonociciti imaju sniženu apsorpciju. Dijagnostika se postavlja na osnovu nutritivnog skrininga, postavljanje dijagnoze uz pomoć GLIM kriterijuma, procena nutritivnog statusa, nutritivnog plana koji se proverava monitoringom. Oralni nutritivni suplementi se koriste za dijabetičare, za plućne bolesnike ili za pacijente sa dekubitusom. Atreficijalna nutricija podrazumeva enteralnu ishranu, preko jejunokolostome i pareneralnu preko centralnog venskog katetera. U radu je istaknut značaj izbranog lekara u prvom prepoznavanju malnutricije. Prikazana je važnost rane nutritivne intervencije. Ukazano je na različite nutritivne strategije u poboljšanju ishoda lečenja. Primena personalizovane nutritivne podrške je veoma važna kako bi se poboljšao ishod lečenja. Od značaja je multidisciplinarni pristup na nivou primarne zdravstvene zaštite da bi se malnutricija otkrila u početnoj fazi, jer je nutritivna nega je jedno od ljudskih prava.

Ključne reči: pothranjenost, suplementi, izabrani lekar

Introduction

Malnutrition is a state of imbalance in the intake and utilization of nutrients that leads to loss of body weight, muscle mass and dysfunction of the organism (1).

There are three different forms of malnutrition: marasmus, kwashiorkor and protein-energy malnutrition. In IKB-10, codes E40-E46 belong to it. Marasmus is a severe form of malnutrition caused by an extreme lack of protein, carbohydrate and fat intake and is manifested by drastic loss of body mass, atrophy of muscles and subcutaneous fat, and most often affects children in developing countries and the elderly (2). Kwashiorkor is a lack of protein in the diet, which leads to edema, anorexia, irritability and an enlarged liver. Children in poor areas are most affected (3). Protein-energy malnutrition is a lack of energy due to the lack of all macronutrients. It usually includes a lack of many micronutrients (4). It can be sudden, total (starvation) or gradual. Severity ranges from subclinical deficiencies to clear wasting (with edema, hair loss, and skin atrophy) to starvation. Disorders of multiple organ systems are common.

In general, malnutrition implies a loss of body weight of 10-15%. If the loss is greater than 30%, there is a risk of death. In Europe, 33 million people are considered to be at risk of malnutrition (5).

The reason may be reduced intake or utilization of substances from food.

In primary health care, it is important to identify underweight patients with a BMI <20.5 in order to respond promptly with nutritional interventions and prevent comorbidity complications.

Nutritional support may be indicated in patients who do not have apparent malnutrition, but a reduced oral intake is expected over a longer period. Usually due to surgery, before chemotherapy or during hospital treatment for other reasons (6).

Causes

The causes of malnutrition can be: Infectious/ecological because certain infectious agents and agents from the external environment can contribute to malnutrition. Gastrointestinal infections can lead to diarrhea, which can result in nutrient loss and malabsorption. In addition, environmental factors such as food insecurity, lack of access to clean water, and poor sanitation can exacerbate malnutrition, especially in low-income regions.

Genetic/autoimmune causes mean that some individuals may be genetically predisposed to malnutrition due to hereditary conditions that affect the absorption or metabolism of substances. An example is celiac disease, an autoimmune disorder that prevents the proper absorption of biomolecules from food. Phenylketonuria leads to malnutrition if patients do not adhere to dietary restrictions.

The influence of lifestyle and diet has an impact on the development of malnutrition. Poor dietary choices, such as high intake of processed foods and low consumption of fruits and vegetables, can lead to a lack of wholesome carbohydrates and proteins. Sedentary lifestyles, excessive alcohol consumption and smoking can further contribute to malnutrition (7).

Several risk factors are shown in table number 1.

Table 1. Important factors for the development of malnutrition

age	Children and the elderly are particularly sensitive
gender	Women, especially during pregnancy and breastfeeding,
the region's climate	may have difficulty accessing healthy foods
comorbidity	
chronic diseases	diabetes, cancer, gastrointestinal disorders affect absorption
socioeconomic status	People with lower incomes

It is considered that ¼ of hospitalized patients are malnourished, 37% are older than 70 years, 35% are oncological, and 29% are cardiology.

Clinical picture of malnutrition

Symptoms from all systems may be present in the clinical picture of patients with malnutrition organ. Respiratory - dyspnea, respiratory acidosis; cardiovascular-reduced extracellular liquid, reduced preload, reduced cardiac output, slowed peripheral circulation; gastrointestinal tract-enterocytes or colonocytes have reduced absorption. Then it comes to weight loss without effort or diet. Symptoms are: constant lack of energy, decreased muscle strength and endurance, difficulty focusing or mental fog, dry skin and hair, changes in skin texture and hair loss, edema or swelling of the legs and abdomen, frequent infections and increased susceptibility to disease.

Chronic starvation can be accompanied by various changes in the body, such as weight loss, biochemical disorders, general weakness, rapid fatigue, decreased muscle strength, lethargy, menstrual cycle disorders in women, and immune system disorders. Diabetes, some chronic diseases of the digestive system, various surgical interventions in the digestive system interfere with the absorption of fat-soluble vitamins, vitamin B12, calcium and iron. Reduced absorption can lead to conditions such as anemia and osteoporosis. Gluten enteropathy, pancreatic insufficiency, chronic renal failure, dysphagia, anorexia, cancers and other diseases can lead to malabsorption. The result of complications of the basic disease or due to a combination of two or more factors, as well as various diets and conscious or unconscious starvation of the body.

If there is not enough food to meet the daily energy needs for one of the above reasons, the organism uses its own reserves. Then the proteins are first broken down, first from the muscle tissue, and then from the internal organs, which can have serious consequences for health (8).

Reduction in body weight of less than 20% leads to complications in surgical patients in about 3.5%, and a reduction in body weight of more than 20% leads to complications as much as 10 times more, around 33%.

During extensive operations, 2% of muscle mass is lost per day. If 1g of muscle mass is lost, it implies a loss of 4g of body weight. Weight loss with and without inflammation can be distinguished.

In the literature, the terms sarcopenia and frailty are used, which are actually companions of old age, but they are different terms (9).

Diagnostics

The diagnosis is made in a series of steps, first seeing if the patient is at risk of malnutrition, then checking where he is according to the The Global Leadership Initiative on Malnutrition (GLIM) criteria for malnutrition, then additional testing to assess the nutritional status in order to create a nutrition plan.

1. Nutritional screening

2. Establishing a diagnosis with the help of GLIM criteria

3. Assessment of nutritional status

4. Creation of a nutritional plan

5. Monitoring of the plan

1. Nutritional risk screening is assessed based on the NRS score (The Nutritional Risk Screening 2002 (NRS-2002)). It includes BMI, weight loss or inability to eat, and the presence of comorbidities.

A score (0-3) implies weight loss, reduced BMI and reduced appetite

The score (0-3) implies a diagnosed internal medicine or surgical disease (fracture, abdominal intervention)

Score +1 for patients older than 70 years,

Total 0 -7; score ≥3 the patient is at risk and a nutritional plan must be made, and score < 3 requires monitoring.

2. GLIM criteria for malnutrition (The Global Leadership Initiative on Malnutrition) implies 1 present characteristic from the group: weight loss >5% in 6 months or >10\% longer than 6 months; BMI <20

kg/m2 in those younger than 70 or <22 kg/m2 in those older than 70; loss of muscle mass detected by densitometry or scanner or physical exercise test

1 characteristic of: reduced intake or absorption of food: 50% loss > weekly, or loss > 2 weekly with the presence of gastrointestinal imbalance; presence of inflammatory disease.

Criteria for malnutrition

Stage I - weight loss of 5-10% in the last 6 months or 10-20% for more than 6 months, BMI <20 kg/m2 in those younger than 70

Stage II - weight loss of about 10% in the last 6 months or 20% for more than 6 months

3. Assessment of nutritional status is based on a detailed anamnesis that identifies factors that could contribute to the existence of malnutrition, as well as diagnostic methods: laboratory, anthropometry (circumference of the upper arm, forearm, hand grip, skin fold), subjective and objective data, ultrasound, densitometry, scanner and magnetic resonance. For didactic reasons, the acronym is used:

A-anthropometry

B-biochemical analyses

C-clinical image of the patient

D-dietary regimen, risk factors smoking, alcohol use

E-eubiosis, influence of external environment, socioeconomic survey, physical status.

4. Creating a nutritional plan

5. If the patient feels better after nutritional support, after monitoring the nutritional status, he is discharged to home treatment with advice on proper nutrition (10, 11, 12).

Table No. 2. Biochemical parameters in relation to the degree of malnutrition

Degree of malnutrition	Normal	Mild malnutrition Moderate malnutrition	Moderate malnutrition	Severe malnutrition
Indeks telesne mase (BMI)	19–24	18–18.9	16–17.9	< 16
Serum albumin (g/dL)	3.5–5.0	3.1–3.4	2.4–3.0	< 2.4
Serum transferin (mg/dL)	220–400	201–219	150–200	< 150
Number of lymphocytes	2000-3500	1501-1999	800–1500	< 800

2000-3500 1501–1999 800–1500 <800 2000-3500 1501–1999

On table no. 2 shows how the laboratory parameters albumin, transferrin and number of lymphocytes decrease with the severity of malnutrition of the patients. In elderly patients, BMI < 21 kg/m2 may increase the risk of mortality.

The World Health Organization declared in 2022 that nutritional care is the right of every human being.

Therapy (4. Creating a nutritional plan)

Therapy should enable the prevention of malnutrition, the selection of adequate replacement of nutrients and the treatment of developed malnutrition.

Oral preparations, enteral and parenteral nutrition are combined in the creation of a nutritional plan. Oral nutritional supplements and artificial nutrients are available. Oral (ONS) are used for diabetics, for lung patients or for patients with pressure ulcers. Atreficial nutrition means enteral nutrition through a jejunocolostomy and parenteral through a central venous catheter. ONS preparations are nutritionally rich drinks or foods designed to compensate for the lack of calories, protein, vitamins and minerals. They are used for illness, recovery after surgery or in the elderly. They are most often in the form of ready-made drinks (liquid formulas), creams, powders or powders that are mixed with water or food. A meta-analysis showed that ONS reduces complications, infection, pressure ulcers in patients with fractures.

Enteral nutrition is the introduction of nutrients directly into the digestive system (through a tube or stoma) in patients who cannot eat naturally. This is the first line of nutritional support when the digestive tract is functioning. Special liquid formulas are used that provide the necessary proteins, fats, carbohydrates, vitamins and minerals, often as supplemental or basic therapy. It is used for neurological diseases, difficulty swallowing, after heavy operations, radiation or cancer. Safer and more effective than intravenous (parenteral) nutrition because it uses the natural digestive process and maintains bowel function. Products intended for enteral nutrition are various shakes and formulas that are easily absorbed.

bowel disease or sepsis to provide the necessary calories, amino acids, fats, electrolytes and vitamins. It covers all nutritional needs of the body. Parenteral nutrition carries the risk of catheter infections, metabolic disturbances (eg, hyperglycemia), and mechanical complications. That is why it requires a strictly sterile approach, careful supervision by professional medical staff and regular laboratory analyses. The primary goal of therapy is to reach optimal body weight.

The benefits of treating malnutrition are improving the quality of life of patients, increasing body weight, reducing complications and slowing down the loss of muscle mass.

Enteral, parenteral nutrition, ONS and an individualized nutritional approach can significantly improve nutritional status.

The selected doctor can only prescribe some syrups for malnutrition due to malignant disease. Other ONS preparations cannot, and patients buy them (13, 14, 15).

Also, the cost-effectiveness of treating malnutrition is very important, because it reduces the length of hospital stay, reduces re-hospitalization and reduces the complications of the disease. Literature data indicate that medical nutritional therapy prevents complications by 37% in 30 days of treatment, while other chronic therapies such as statins by 30%, ACE inhibitors by 50% and antidiabetics by 27% prevent complications after years of treatment (16).

According to some authors, the treatment of complications of surgical or internal medicine patients, which worsen due to malnutrition, amounts to 170 billion euros per year.

The importance of the doctor of choice in the treatment of patients with malnutrition.

Malnutrition is present in 3-33% of patients in primary health care. It is mostly registered in elderly patients, those with chronic diseases, those with mental illnesses and those with recent surgical intervention.

The role of the chosen physician is to identify patients at risk of malnutrition and calculate BMI as unintentional weight loss is considered to be the first key indicator of this. More time should be devoted to patients at risk during a working day, in addition to the large volume of work. One of the questionnaires for the assessment of malnutrition (Malnutrition Universal Screening Tool (MUST)) can be done on that occasion. The diet of malnourished patients should be hyperenergetic, hyperprotein, rich in carbohydrates, minerals and vitamins, with a moderate fat content. 6 meals are introduced for 2-2.5 hours, a meal before bed (night snack) is mandatory. Complex carbohydrates (white sugar, confectionery, white bread, too much dough) are not desirable even in undernourished people.Proteins (meat, fish, eggs, dairy products) are the main source of energy in malnutrition, because body weight and muscle mass should be increased (17, 18) .

Multidisciplinarity in the treatment of malnutrition at the primary level of health care is also suggested by forming teams consisting of a doctor, nurse and nutritionist in order to advise patients on further nutrition, as well as continuous education of doctors in this direction (19, 20).

Conclusion

The paper highlights the importance of the chosen one doctors in the first recognition of malnutrition.

The importance of early nutritional intervention is shown.

Various nutritional strategies have been indicated in improving treatment outcomes.

Application of personalized nutritional support is very important to improve treatment outcome.

A multidisciplinary approach at the level of primary health care is important in order to detect malnutrition in the initial phase, because nutritional care is one of the human rights.

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